

## **CLAIMS:**

We claim:

1. A device for detecting the presence of an analyte in a sample, the device comprising:  
5 a substrate,  
a binder printed in a defined pattern onto a surface of the substrate, and  
a guide that directs a sample towards the surface of the substrate that is printed with the binder.

10 2. The device of Claim 1 wherein the guide is adapted to permit light or other electromagnetic radiation to be directed through the guide to the surface of the substrate printed with the binder or wherein the device further comprises an opening that is adapted to permit light or other electromagnetic radiation to be directed through the opening to the surface of the substrate printed with the binder.  
15

3. The device of Claim 1 wherein the device further comprises a layer of wicking agent disposed on the surface of the substrate printed with the binder and the layer of wicking agent comprises an opening through which light or other electromagnetic radiation can be directed to the surface of the substrate printed with the binder.  
20

4. The device of Claim 1 wherein the guide directs at least a first portion of the sample toward the surface of the substrate that is printed with the binder and directs at least a second portion of the sample to a surface that is printed with a binder.  
25

5. The device of Claim 1, wherein the device further comprises a second binder printed in a pattern onto a portion of the surface of the substrate.  
30

6. The device of Claim 1 wherein the diffraction-based diagnostic device further comprises a second guide that directs a sample towards a surface of a substrate that is printed with the binder.

7. The device of Claim 1 wherein the substrate transmits light or other electromagnetic radiation or the surface of the substrate that is printed with the binder reflects light or other electromagnetic radiation.

5           8. A device for detecting the presence of an analyte in a sample, the device comprising:  
a substrate,  
a binder printed in a pattern onto a surface of the substrate, and  
a means for directing a sample towards the surface of the substrate that is  
10       printed with the binder.

9. The device of Claim 8 wherein the means for directing a sample towards the surface of the substrate that is printed with the binder is selected from the group consisting of capillaries, conduits, tubular structures, channels, slots,  
15       parallel plates, grooves and other types of openings, passages or penetrations, porous materials of various shapes and configurations, surfaces having varying degrees of surface energy or hydrophobicity, pumps, vacuums, suction, and air pressure.

20           10.       The device of Claim 9, wherein the means for directing a sample comprises a structure that directs the sample from a source for the sample toward the surface of the substrate that is printed with a binder through use of capillary forces or capillary action.

25           11.       The device of Claim 10, wherein the means for directing a sample towards the surface of the substrate that is printed with a binder comprises a capillary.

30           12.       The device of Claim 11, wherein the means for directing a sample from a source of the sample towards surface of the substrate that is printed with a binder comprises a material or a structure that has an affinity for the sample that is greater than the affinity of the sample to the source from which the sample is obtained.

35           13.       The device of Claim 8 wherein the means for directing a sample from a source of the sample towards surface of the substrate that is printed with a

binder is adapted to permit light or other electromagnetic radiation to be directed through the means to the surface of the substrate printed with the binder or wherein the device further comprises an opening that is adapted to permit light or other electromagnetic radiation to be directed through the opening to the surface of the substrate printed with the binder.

14. The device of Claim 8 wherein the device further comprises a layer of wicking agent disposed on the surface of the substrate printed with the binder and the layer of wicking agent comprises an opening through which light or other electromagnetic radiation can be directed to the surface of the substrate printed with the binder.

15. The device of Claim 8 wherein the means for directing a sample from a source of the sample towards surface of the substrate that is printed with a binder directs at least a first portion of the sample toward the surface of the substrate that is printed with the binder and directs at least a second portion of the sample to a surface that is printed with a binder.

16. The device of Claim 8 wherein the device further comprises a second means for directing a sample from a source of the sample towards surface of the substrate that is printed with a binder that directs a second sample towards a surface of a substrate that is printed with the binder.

17. A system for detecting the presence of an analyte in a sample comprising:  
a substrate,  
a binder printed in a pattern onto a surface of the substrate, and  
a means for directing a sample towards the surface of the substrate printed with the binder; and  
a light or other electromagnetic radiation source that is positionable so that the light or other electromagnetic radiation source can be directed to the surface of the substrate printed with the binder.

18. The system of Claim 17, wherein the system further comprises a second opening so that the light or other electromagnetic radiation source can be

directed through the second opening to the surface of the substrate printed with the binder.

19. The system of Claim 17, further comprising a means for detecting a diffraction signal, image or pattern when a light source or other electromagnetic radiation is transmitted through or is reflected from the surface of the substrate printed with the binder.

20. The system of Claim 17, wherein the light source is a focused light source.

21. The system of Claim 21, wherein the light source is a laser.

22. The system of Claim 17, wherein the light source is a monochromatic light source.

23. The system of Claim 17, further comprising a detector.

24. The system of Claim 23, detector comprises a photodiode or an array detector.

25. A disposable, diffraction-based diagnostic device for detecting the presence of an analyte in a sample comprising:

a film,

a first binder for a first analyte printed in a pattern on to at least a first portion of the surface of the film,

a first means for directing at least a portion of a sample from a source of the sample towards the at least first portion of the printed surface of the film,

a second binder for a second analyte printed in a pattern onto at least a first portion of the surface of the film, and

a second means for directing at least a portion of a sample from a source of the sample towards the at least second portion of the printed surface of the film.

26. The disposable, diffraction-based diagnostic device for detecting the presence of an analyte in a sample of Claim 25, wherein the film is transparent.